REMARKS

Claims 1-20 were pending. Claims 1, 2, 6, 7, 11, 14, 17, and 19 have been amended. Accordingly, claims 1-20 are presented and at issue. Claims 1, 6, 11, 14, 17 and 19 are the only independent claims. The Office Action mailed on October 7, 2004 has been reviewed and carefully considered. Claims 1-20 were rejected under 35 USC 103(a) as being unpatentable over Jasgur, U.S. Patent No. 3,567,309. In light of the amendments to the claims and the following Remarks, reconsideration and withdrawal of the aforementioned rejections are respectfully requested.

Before discussing the cited prior art and the Examiner's rejections of the claims in view of that art, it would be appropriate to present a brief summary of applicants' claimed invention. With regard to independent claims 1, 6, 11, and 14, systems and methods are provided for enhancing the visibility of ***a distant scene containing visual information*** in the presence of ***interposing specular*** media. These systems and methods use an observation filter, a light source including or coupled to a source polarization mechanism, and a mechanism for adjusting the source polarization mechanism relative to the source polarization angle. The source polarization mechanism generates polarized light that is substantially polarized at a light source polarization angle. The observation filter, used to filter polarized light, has a filter polarization angle providing substantially maximum light attenuation or substantially minimum light attenuation. The mechanism for adjusting the source polarization mechanism relative to the filter polarization angle is adjustable, so as to ***improve visual contrast between the distant scene and the interposing specular media by reducing or minimizing glare from the interposing specular media without regard to reducing reflectivity from any specularly reflecting object in the***

distant scene, and wherein the distant scene is situated at least two meters from the observation filter.

Independent claims 17 and 19 present systems and methods for enhancing infrared-based night vision of a distant scene including an object that produces infrared glare and at least one other object. Polarized infrared light is substantially polarized at a light source polarization angle. The polarized infrared light is filtered with an observation filter having a filter polarization angle of (i) substantially maximum infrared light attenuation, or (ii) substantially minimum infrared light attenuation. The source polarization angle is adjusted relative to the filter polarization angle, ***so as to improve visual contrast between the object that produces infrared glare and the at least one other object by reducing or minimizing glare from the object that produces infrared glare without regard to reducing infrared glare from the at least one other object, wherein the distant scene is situated at least one meter from the observation filter.***

A. Claim Rejections under 35 USC 103(a)

The Examiner rejected dependent claims 1-20 as being unpatentable over Jasgur, U.S. Patent No. 3,567,309. With respect to independent claims 1, 6, 11, and 14, the Examiner noted that Jasgur fails to teach applicants' claimed methods and systems wherein "(c) a mechanism is provided for adjusting the source polarization relative to the filter polarization angle, wherein the difference between the light source polarization angle and the filter polarization angle falls substantially within the range of 60 to 89 degrees or 91 to 120 degrees, so as to improve visual contrast between a distant object to be viewed and specular media, and wherein the distant object is situated at least two meters from the observation filter." However, the Examiner alleges that it would be obvious to

modify Jasgur to provide the aforementioned mechanism for adjusting the source polarization because Jasgur provides a small rotating tab 24 arcuately moveable in slot 25 for adjusting a filter polarization mechanism relative to a source polarization mechanism. With reference to independent claims 17 and 19, the Examiner stated that Jasgur does not disclose an infrared-based night vision system, but indicated that the Jasgur disclosure could be extrapolated to the infrared wavelength range.

The teachings of Jasgur are directed to an eyepiece for use by medical professionals. The eyepiece is a self-contained structure comprised of a tubular portion 17 (FIG. 2) and a second tubular structure 18. The tubular portion 17 and the second tubular structure 18 form a T-shaped structure containing a light source (bulb 19), first polarizing means 21, and second polarizing means 23. An opening at the right end of tubular structure 17 defines a light exit opening through which an object to be viewed is illuminated. An opening at the left end of tubular structure 17 defines a viewing opening by which a single eye 26 is able to view the illuminated object.

In view of the Examiner's rejection, independent claims 1, 6, 11, 14, 17 and 19, as well as dependent claims 2 and 7, have been amended to more particularly emphasize the novel aspects of applicant's invention. Claims 1, 6, 11, and 14 are now directed to a system for ***enhancing visibility of a distant scene containing visual information***. Examples of such scenes are shown in FIGs. 3, 4B, and 7-9 of applicant's disclosure. These scenes are discussed, for example, at page 10, line 18 to page 11, line 1 of applicant's disclosure. Visibility of the scene is enhanced ***in the presence of interposing specular media***. Examples of interposing specular media are discussed, for example, at page 10, lines 13-17 of the specification. ***Visual contrast between the distant scene and the interposing specular media is improved by reducing or minimizing glare from the interposing specular media without regard to reducing reflectivity from any specularly reflecting object in***

the distant scene, and wherein the distant scene is situated at least two meters from the observation filter.

Jasgur fails to render applicant's claimed invention obvious. First of all, there are fundamental differences between the operational environment of applicant's claimed invention and that of the Jasgur device. Jasgur teaches a technique for enhancing the visibility of a target object by reducing glare generated by the target object itself. By contrast, applicant's invention as set forth in independent claims 1, 6, 11, and 14 enhances the visibility of an entire scene, not by reducing glare generated by the object to be viewed, but instead by reducing the glare generated by interposing specular objects. In other words, the teachings of Jasgur deal with the problem of reflections from a shiny, specularly reflecting target object such as human tissue. Jasgur focuses only on the object to be viewed. Applicant's invention deals with the problem of interposing media between a viewer and a scene to be viewed. Unlike Jasgur, the techniques of applicant's invention do not require the existence of a shiny object off in the distance.

Applicant's invention provides a technique for enhancing the effective signal-to-noise ratio of a distant scene by controlling viewed reflections from interposing media. In practice, the signal-to-noise ratio of a scene could be degraded when interposing media such as rain, fog, or snow are interposed between an observer and a scene. Unlike the operational setting described in Jasgur, this scene need not contain a specular or reflective object. Applicant's claimed invention is useful even in situations where the scene contains dull or matte objects, such as an elderly woman in a woolen sweater crossing a foggy San Francisco street at dusk.

An additional distinction between Jasgur and applicant's claimed invention is that applicant's invention permits three-dimensional human visual perception of a distant scene, whereas Jasgur provides a two-dimensional image of a target. Since Jasgur discloses a single-eye viewing

device, a human observer is only able to discern a flat, two-dimensional image of a target object. As those who have suffered a temporary eye injury are painfully aware, three-dimensional vision requires two eyes, not one. By contrast, applicant's claimed invention does not require use of a single-eye viewing device. Rather, the claimed invention enhances the visibility of three-dimensional scenes that are only capable of being perceived using bicameral (that is, two-eye) vision. Examples of such three-dimensional scenes are shown in FIGs. 3, 4B, and 7-9. Whereas applicant's invention is useful for enhancing safety in the operational environment of a car, train, truck, bus, or airplane, use of the Jasgur eyepiece in any of these settings could cause an accident by diverting driver/pilot attention from the task at hand.

By way of further distinction, Jasgur discloses a viewing device that is not adapted for use over applicant's claimed distance of at least two meters. Rather, Jasgur discloses a small, portable, handheld device intended to assist in tissue examination. Such examination is invariably conducted at short ranges of substantially less than one meter. With reference to col. 1, lines 69-72 of Jasgur, "[a] particular object of the invention is to provide a viewing device adapted for use...by doctors, dentists, and biologists for examination of tissue, external skin areas, internal mucous membranes, and the like." To achieve this object, the tubular portion 18 serves "as a convenient handle for manipulating the device by a user with one hand" (col. 3, lines 44-46). Accordingly, Jasgur is not equipped to enhance the visibility of a scene viewed at a distance of two meters or greater. The Jasgur device controls specular reflections from nearby surfaces using an internal light source in the form of a small light bulb 19 (FIG. 2). As a compact, encased unit, it is incapable of illuminating a runway or roadway, or for providing controlled general illumination of outdoor spaces.

Another fundamental distinction between Jasgur and applicant's claimed invention is that Jasgur is a self-contained viewing device operating in a light-controlled environment. Jasgur uses

tubular portion 17 and second tubular structure 18 to substantially exclude all ambient light from the viewing device. By contrast, due to the non self-contained nature of applicant's claimed invention, the characteristics of an uncontrolled ambient environment are automatically incorporated into the viewing process. With reference to FIG. 3 and page 19, lines 3-7 of applicant's disclosure, applicant's invention is applicable to parked vehicles, buildings, trains, people, animals, signs, airplanes, radio towers, runways, road surfaces, and lane markings. Accordingly, applicant's claimed observation filter is operative on light received from the light source, but is also operative on ambient light received from environmental sources such as streetlights, illuminated signs, sunlight, and moonlight. Due to the configuration of applicant's claimed system, adjustment of the observation filter enhances visibility of a scene based upon all received light, including ambient light, and not just light received from the light source.

At the relatively close distances inherent to the operational environment of Jasgur, minor amounts of dust, pollen, clay, fibers, or other non-specular particulates will not significantly obscure or confuse the received image. However, at distances beyond a meter or two, when fog, snow, or heavy rain impart a visually degraded effect upon a viewed scene, the Jasgur device would not be useful in maximizing the ratio of useful scene information to visual noise. The light of Jasgur's internal illumination source would be entirely consumed in the precipitation.

A still further distinction between Jasgur and the claimed invention relates to the manner in which the polarization difference between a first and a second polarizing means is adjusted. According to the teachings of Jasgur, "[t]he difference in polarization is 90 degrees, controlling glare and highlighting the object being examined" (col. 1, lines 19-21). By contrast, applicant's claimed invention adjusts the source polarization angle relative to the filter polarization angle, so as to improve visual contrast between the distant scene and the interposing specular media ***by***

reducing or minimizing glare from the interposing specular media without regard to reducing reflectivity from any specularly reflecting object in the distant scene. When this claimed adjustment is performed, the difference between the source polarization angle and the filter polarization angle may be a value other than 90 degrees. Typically, the angle necessary to reduce or minimize glare from interposing specular media is in the range of 60 to 120 degrees. On the other hand, Jasgur teaches that 90 degrees is the optimum angle necessary to reduce glare from an object under examination.

In the operational setting of applicant's claimed invention, a difference in polarization of exactly 90 degrees is potentially disastrous. For example, applicant's invention is applicable to observation of a distant scene that includes vehicular traffic or large moving objects. At an angular setting of 90 degrees, important visual information may be eliminated from the distant scene. Glare from a specular object in the scene, such as the rear chrome bumper of a car two hundred feet ahead, could be reduced to the point where the bumper is no longer clearly discernible. Accordingly, in these types of settings it is not appropriate to use Jasgur's maximum glare reduction approach wherein the angular setting is set to exactly 90 degrees for maximally reducing the aforementioned bumper reflections. Instead, pursuant to applicant's claimed invention, the angular setting is adjusted to minimize reflections from interposing specular media, such as fog or snow, that are situated between the observer and the chrome bumper, without regard to reducing reflections from the chrome bumper itself.

Adjusting the angular setting according to applicant's claimed invention increases the effective "signal to noise ratio" of a visual scene while, at the same time, not eliminating important visual information from the scene. Conceptually, a scene is comprised of visual information and interference (or visual noise). Visual noise is created by specularly-reflecting

media that are interposed between the scene and an observer. Visual information includes light reflected from a scene to the observer. In the context of driving, a scene includes vital visual information such as nickel/chromed surfaces on disabled vehicles, or the reflected glints from the eyes of a moose in the road ahead. A system optimized for fixed, 90-degree, full extinction of polarized reflections may cancel out all reflections from the vital visual information described above, thereby creating a misleading image at best or dangerous conditions at worst. Accordingly, applicant's invention as set forth in independent claims 1, 6, 11, and 14 focuses on the attenuation of glare from interposed specular media, and not on the attenuation of glare from a specific object to be viewed.

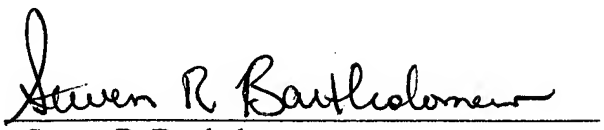
With respect to independent claims 17 and 19, systems and methods are presented for enhancing infrared-based night vision of a distant scene including an object that produces infrared glare and at least one other object. Polarized infrared light is substantially polarized at a light source polarization angle. The polarized infrared light is filtered with an observation filter having a filter polarization angle of (i) substantially maximum infrared light attenuation, or (ii) substantially minimum infrared light attenuation. The source polarization angle is adjusted relative to the filter polarization angle, ***so as to improve visual contrast between the object that produces infrared glare and the at least one other object by reducing or minimizing glare from the object that produces infrared glare without regard to reducing infrared glare from the at least one other object, wherein the distant scene is situated at least one meter from the observation filter.*** Accordingly, independent claims 17 and 19 focus on the attenuation of glare from an object that produces infrared glare so that the remainder of a scene can be viewed. Unlike Jasgur, claims 17 and 19 do not deal with the attenuation of glare from a specific target object to be viewed.

In view of the foregoing analysis, independent claims 1, 6, 11, 14, 17 and 19 are not obvious in view of Jasgur. Claims 2-5 depend, either directly or indirectly, from claim 1. Claims 7-10 depend, either directly or indirectly, from independent claim 6. Claims 12 and 13 depend from independent claim 11. Claims 15 and 16 depend from independent claim 14. Claim 18 depends from independent claim 17, and claim 20 depends from independent claim 19. Accordingly, it is submitted that claims 2-5, 7-10, 12, 13, 15, 16, 18, and 20 are patentable over Jasgur for the reasons set forth above in connection with claims 1, 6, 11, 14, 17 and 19.

B. Summary

In view of the foregoing considerations, it is submitted that claims 1-20 are allowable over the prior art of record, and such action by the Examiner is earnestly solicited.

Respectfully submitted,



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